

Appl. No. 10/720,812
Amdt. Dated November 15, 2006
Reply to Office action of August 15, 2006

RECEIVED
CENTRAL FAX CENTER

NOV 15 2006

REMARKS/ARGUMENTS

Claims 1-48 are pending in the present application.

This Amendment is in response to the Office Action mailed August 16, 2006. In the Office Action, the Examiner rejected claims 9-12, 15-20, 23, and 24 under 35 U.S.C. §103(a). Reconsideration in light of the amendments and remarks made herein is respectfully requested.

Restriction Requirement

In the Office Action, the Examiner contends that the Applicants chose the generic term, rather than a species of the passive element, nor made a statement that the different and alternate species were obvious variants (Office Action, page 6, paragraph 3). Applicants respectfully disagree. In the previous response, Applicants made clear that claims 13 and 14 provide additional limitations to the passive element. The Examiner has the burden to show that the inventions must be independent or distinct as claimed. MPEP 803. Since the burden has not been met, the restriction is improper.

Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 9-12, 15-20, and 23-24 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,821,624 issued to Pasch et al. ("Pasch"). Applicants respectfully traverse the rejection and submit that the Examiner has not met the burden of establishing a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *MPEP §2143, p. 2100-129 (8th Ed., Rev. 2, May 2004)*. Applicants respectfully submit that there is no suggestion or motivation to combine their teachings, and thus no *prima facie* case of obviousness has been established.

Pasch discloses a semiconductor device assembly technique using preformed planar structures. A programmable interposer may use embedded electronic switches because any

Appl. No. 10/720,812
Amdt. Dated November 15, 2006
Reply to Office action of August 15, 2006

electronic element, active or passive, may be embedded in the interposer (Pasch, col. 24, lines 34-42). An adhesive may be used to keep the substrate/interposer/ die stack under compression (Pasch, col. 25, lines 22-25). The interposers with their associated probe finger contacts may provide electrical contact with the solder bumps on a facing die (Pasch, col. 24, lines 54-56).

Pasch does not disclose, either expressly or inherently, at least one of (1) a thin-film passive element integrated on a spacer between upper and lower dies in stacked dies on a package substrate, and (2) conductors attached to the passive element to connect the passive element to at least one of the upper and lower dies.

Pasch merely discloses an assembly of a die 1110 to a substrate 1130 includes an interposer 1120 (Pasch, col. 20, lines 7-10), not stacked dies. Furthermore, Pasch does not disclose the stacked dies on a package substrate. Pasch merely discloses two similar-size dies being flip-chip assembled with a traced interposer disposed between them to form an assembly (Pasch, col. 23, lines 29-32). A flip-chip assembly is not stacked dies on a package substrate. Applicants note that the phrase substrate/interposer/die stack used in Pasch (Pasch, col. 25, lines 22-24) merely indicates a stack of a substrate, an interposer and a die. This is clearly different from a stack of dies on a package substrate, or stacked dies, which include a number of dies stacking on each other placed on a package substrate.

Moreover, Pasch does not disclose or suggest a thin-film passive element. The Examiner contends that Pasch teaches that the interposer is rather thin, thus suggesting only a thin film device may be integrated on the interposer (Office Action, page 4). Applicants respectfully disagree. Pasch merely discloses interposer with integral probe fingers (Pasch, col. 20, lines 7-8). Probe fingers within the interposer extend into through holes (Pasch, col. 20, lines 20-31). This suggests that the interposer is not integrated on a space between lower and upper dies. Even if Pasch discloses that the interposer is thin, this does not suggest a thin-film device may be integrated on the interposer. In fact, by teaching probe fingers extend into through holes, Pasch effectively teaches away from the invention because extending into through holes would render integrating a thin-film device inefficient.

Regarding claim 11, the Examiner contends that the element may be a thin film, citing "thin metal film" in column 26, line 16. However, a thin metal film is not a thin-film passive element. It is a metal element. Pasch specifically discloses that the thin film of a noble metal is

Appl. No. 10/720,812
Amdt. Dated November 15, 2006
Reply to Office action of August 15, 2006

incorporated into the holes of the interposer to galvanically isolate the bumps of the chip from those of the substrate (Pasch, col. 25, lines 58-61). Therefore, this thin-film metal cannot be a thin-film passive element. The Examiner further contends that Figure 12b shows the passive element between the space and the lower adhesive layer (Office Action, page 3, second to the last paragraph). Applicants respectfully disagree. Figure 12b merely shows a combination of inert metal stoppers. The interposer 1222 is placed between a die 1212 and a substrate 1232 (Pasch, col. 26, lines 58-60; Figure 12b). Inert metal film stoppers 1225a and 1225b are embedded in the interposer 1232 (Pasch, col. 26, lines 66-67; col. 27, lines 1-5). Solder bump contacts and mating solder bump contacts are disposed on corresponding surfaces (Pasch, col. 26, lines 61-64; col. 27, lines 8-16). None of these related to the space and the lower adhesive layer.

Regarding claim 17, the Examiner contends that Pasch teaches a plurality of stacked dies and a spacer assembly, citing Figure 11B and col. 24, lines 39-41. Applicants respectfully disagree. Figure 11B merely shows the die 1110, the interposer 1120, and the substrate 1130. There is only a single die, namely the die 1110. As discussed above, the stack of die, interposer, and substrate is not the same as a stack of dies or stacked dies which include a number of dies.

The Examiner failed to establish a prima facie case of obviousness and failed to show there is teaching, suggestion, or motivation to combine the references. When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) Reasonable expectation of success is the standard with which obviousness is determined. Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). "When determining the patentability of a claimed invention which combined two known elements, 'the question is whether there is something in the prior art as a whole suggest the desirability, and thus the obviousness, of making the combination.'" In re Beattie, 974 F.2d 1309, 1312 (Fed. Cir. 1992), 24 USPQ2d 1040; Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 1462, 221 USPQ (BNA) 481, 488 (Fed. Cir. 1984). To defeat patentability based on obviousness, the suggestion to make the new product

Appl. No. 10/720,812
Amdt. Dated November 15, 2006
Reply to Office action of August 15, 2006

having the claimed characteristics must come from the prior art, not from the hindsight knowledge of the invention. Interconnect Planning Corp. v. Feil, 744 F.2d 1132, 1143, 227 USPQ (BNA) 543, 551 (Fed. Cir. 1985). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the Examiner to show a motivation to combine the references that create the case of obviousness. In other words, the Examiner must show reasons that a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the prior elements from the cited prior references for combination in the manner claimed. In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1996), 47 USPQ 2d (BNA) 1453. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973. (Bd. Pat. App. & Inter. 1985). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." In re Mills 916 F.2d at 682, 16 USPQ2d at 1432; In re Frich, 972 F.2d 1260 (Fed. Cir. 1992), 23 USPQ2d 1780.

In the present invention, the cited references do not expressly or implicitly suggest any of the above elements. In addition, the Examiner failed to present a convincing line of reasoning as to why a combination of Pasch is an obvious application of integrating passive components on spacer in stacked dies.

Therefore, Applicants believe that independent claims 9 and 17 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicants respectfully request the rejection under 35 U.S.C. §103(a) be withdrawn.

Appl. No. 10/720,812
Amdt. Dated November 15, 2006
Reply to Office action of August 15, 2006

RECEIVED
CENTRAL FAX CENTER

NOV 15 2006

Conclusion

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: November 15, 2006

By


Thinh V. Nguyen

Reg. No. 42,034

Tel.: (714) 557-3800 (Pacific Coast)

12400 Wilshire Boulevard, Seventh Floor
Los Angeles, California 90025

CERTIFICATE OF MAILING/TRANSMISSION (37 CFR 1.8A)

I hereby certify that this correspondence is, on the date shown below, being:

MAILING

☐ deposited with the United States Postal Service
as first class mail in an envelope addressed to:
Commissioner for Patents, PO Box 1450,
Alexandria, VA 22313-1450.

Date: November 15, 2006

FACSIMILE

☒ transmitted by facsimile to the United States Patent
and Trademark Office.


Tu Nguyen

November 15, 2006

Date